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Feniseca tarquinius
Chrysalis (enlarged)

FEBRUARY, 1899.

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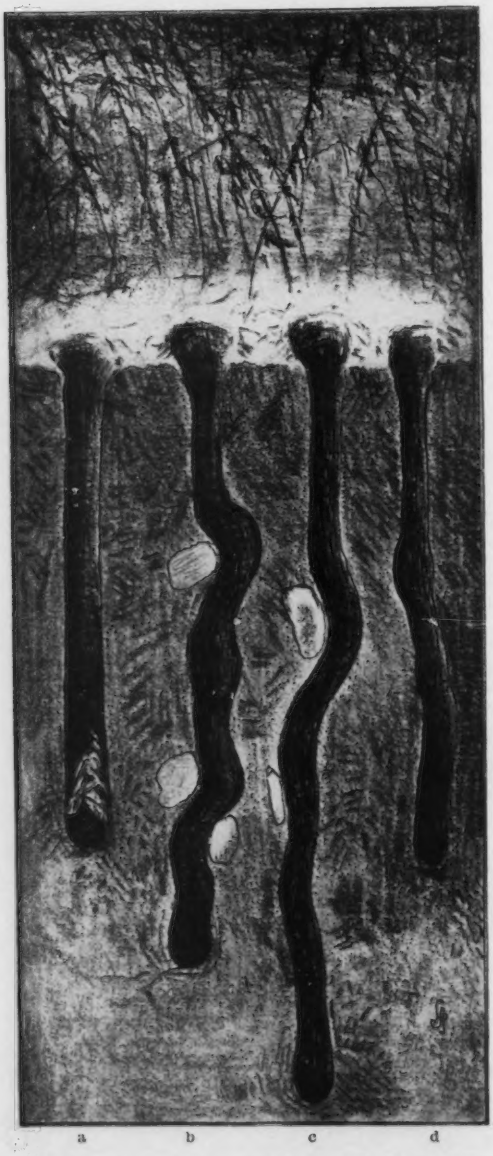

Different forms of burrows of the Castle-building Spider.
a, occupied by POMPILUS MARGINATUS. Original.
From nature by the author.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. X. FEBRUARY, 1899. No. 2.

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THE CASTLE-BUILDING SPIDER.

By DR. J. L. HANCOCK.

Illustrations by the Author.

The sandy wastes bordering the lower end of Lake Michigan, in Northern Illinois, are inhabited by several species of tube-constructing spiders. Though any one of the forms occurring here would repay study, for the present I will consider a species which, from the peculiar habit of building a little castle or nest at the opening to the tube, makes it of more than ordinary interest. This Lycosid is likely to be taken at first glance for the turret-spiders L. *arenicola* or L. *turricola*, but it is quite distinct from either of them. The spider is equally expert whether engaged as a carpenter, weaver, mason or digger, all of which attributes she brings to bear some time or other in making her completed retreat. The female shown in the illustration, Fig. 1, is always found in the burrows when dug out of the ground, unless some mishap has overtaken her.

In the Fall of 1896 I found my way into an uncultivated lot where weeds in profusion had unbounded sway, cenchrus being particularly in evidence. Patches of high grass, sedges and ragweeds made the open lay of ground a paradise of running spiders. Here it was the castle-building species seemed perfectly at home, showing its varied accomplishments to best

advantage. The artfully hidden castle is not apparent to the uninitiated while walking over the ground, as it is commonly secreted in a recess of overhanging dried grasses. Frequent visits to several localities added greatly to my observations, and, though the greater number were made in the late fall, at the suggestion of Mr. Emerton, some time was spent in June, in the following and present year, in anticipation of finding them mating. In this I was disappointed and all efforts to find the male was fruitless.

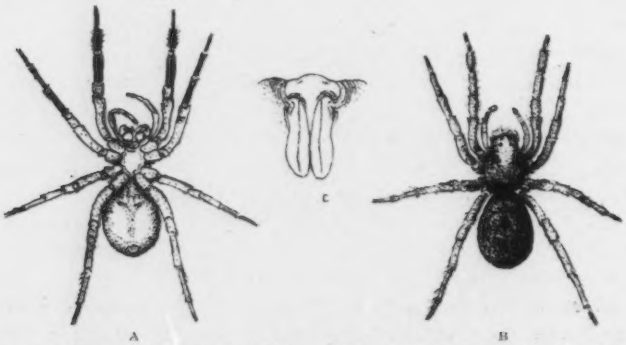


FIG. 1. (a) The Castle-building Spider, ventral view. (b) Same, dorsal surface. (c) Female epiginum. Original from nature.

One of the castles which I alluded to above, the first of my discoveries, will be described as a means of furnishing a general idea of the kind of nest made, afterwards recurring to the subject of castles further on, when considering the tubes throughout. When one remembers the average size of the adult castle, only five-eights of an inch high, and a little over one-half inch in diameter, it is obvious that close inspection is quite essential.

This castle was situated beside a half-buried piece of branch, a site which was chosen often. Around it was growing little seedlings and lichens which grew from the superficial deposit of vegetable mould, and giving to the surroundings the effect of a small garden colored with sienna and green. The nest proper was quite round; fragments of chickweed, bark and rootlets, woven together with silk, went to make up most of the structure, while to one side a dried leaf of ragweed was æsthetically curved around and attached, leaving other bits of leaves

incorporated into its margin. Two grass leaves were brought down from a plant near by and festooned to two sides, the finishing touch being a dagger-pointed bur poised on the margin. By the time several nests were examined I found evidence of the most whimsical tastes in the selection of material for nests, an enumeration of which is here given:

Green and dried grass leaves, dried fine sedges, spikes and leaves of foxtail grass, fibrous roots, ragweed leaves curved by drying, cenchrus or burgrass spikes and burs, wing of beetle, weather beaten white paper, piece of brown string, twigs of various kinds in bits, dark bark, seeds of weeds, bird excrement, sand made into pellets, small stones and gravel from soil.

Exploring the tubes with a straw was not without reward, for I found by feeling the way down carefully, until meeting resistance, the live spider when touched communicates a motion to the straw sticking above the ground. To learn more of the occupant one has but to dig a hole down at the side to avoid injuring the castle, then making an undercut below extending to the tube; follow it down to the bottom where the spider rests with its head pointing upwards. The Fall of the year finds various sized individuals of different ages preparing to pass the winter in burrows. Sometimes just within the castle a fine screen of silk is woven across the entrance as an obstruction against floods or the possible entering of hymenopterous enemies, which is again torn away after all danger is passed.

The young, even down to the smallest, show a wonderful instinct for castle building. This I saw depicted in the dainty character of many of their works. Activity is expressed on every side at this period of the year. Little yellow sand pellets encircling the openings told plainly that the spider's year is nearing a close. They had a forewarning of the coming winter and sought refuge by deepening their retreats to get safely below the freezing line. The love of warmth was exemplified even after the first fall of snow, for the appearance of the warm sun's rays enticed them to come up to get a last glimpse of the sun from the top of the castle. From what I gleaned, old spiders live in their burrows for more than a season and often remodel them after being injured by storms. They hold great fondness for their homes and try resolutely to stick by them,

going out long enough only to catch insect food. Even this is seldom, for much food is taken in at the very threshold of the castle. Younger specimens re-dig outgrown burrows, enlarging them as occasion requires. It was interesting to observe neighborly beetles and other species of spiders, not to be outdone, with one accord churn up the soil by their diggings.

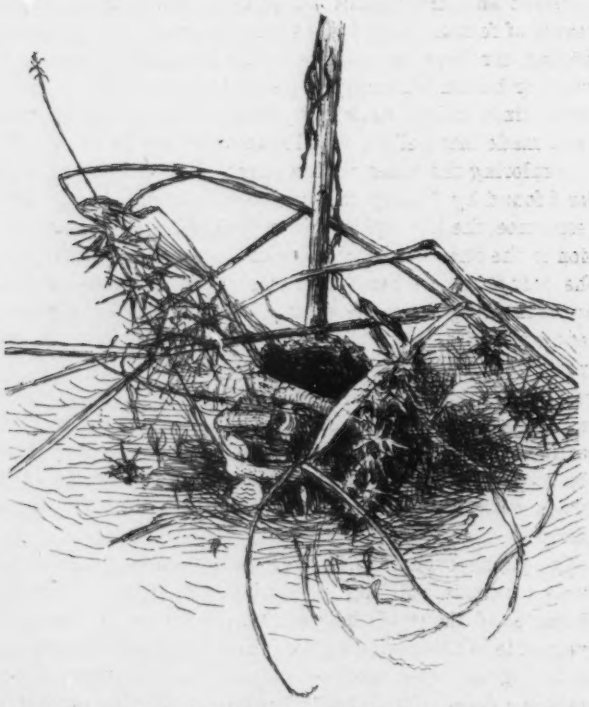


FIG. 2. A castle or nest of the Castle-building Spider, natural size, from nature, by the author.

When the vernal spell is changed by lowering temperature, quiet creeps upon the scene. Usually the spider's tube is constructed vertically in the ground unless, as is shown in the reduced plate illustration, obstructions cause some deviation. The four different examples here shown were opened from the side, being careful to preserve their form. A silk lining is put on by the spider, which is continuous with the inside of the

castle. In the construction of the tube damp earth facilitates working materially, but being equal to the occasion the spider can dig a tube in dry sand, requiring extra effort and a good deal of ingenuity. The process is so simple, however, when compared with the complicated mechanism used by one contemplating sinking such a shaft on a large scale that it is worthy of special note. In setting out to make the tube she proceeds with some slight variation in the following way: Standing on tiptoe the spider moves her abdomen around almost in a circle between her legs, touching the ground here and there with the spinnerettes at the end of the body. The silk pouring out catches fast in the soil, and in a moment an adherent round flooring of about ten millimeters across is formed. Then she turns about, digging up the little silk mat entangled with sand, and in a twinkling has made it into a parcel, which is laid to one side. Again she spins out silk over the same spot and dexterously lifts up the mass, lays the pellet beside the preceding, until by repetitions she has temporarily encircled the newly-made pit with her internal diggings. At times she stands head down in the hole and pats down the new-formed mouth with her inverted abdomen. Within an hour she is down the depth of her body and the hole excavated sufficiently large to turn around in, but now each parcel after being w[illegible]apped from her mandibles with a sudden motion of t[illegible]hen up to the entrance. As she progresses the [illegible]ed with silk, often going over the surface to prevent a [illegible]aving in of the earth. Now we find her taking a well-earned rest, and not until darkness is fully established does she commence her castle. In vivarium I watched spiders by artificial light under conditions quite natural. Coming out of her tube I saw her grasp a prickly sphere of burgrass, and taking it to the burrow she adjusted it to the border of the opening. In a few moments she gathered two more of the burs, one at a time placing them to form a partial border; the intervening spaces between them were filled with sand pellets, which she made and brought up from the inside of the tube. Taking this to be the foundation of her future castle, I took the opportunity of trying an experiment, that is, of furnishing material. The ground, quite bare near her tube, was strewn with a selection of short pieces of bleached

grasses, the top of a foxtail grass, which I had seen composing other nests, beside some weed stems, and three little rolled pieces of red, white and blue paper. The spider, which had disappeared for a time below the surface, now came to the opening, and walking over to one of the grasses she picked it up and carried it to the edge, where, letting it go, she turned around within the tube and attached it at the middle to the entrance with multiple strands of silk. Another grass stem was next taken, which she laid crossing the first, on top of the half buried burs. Then her attention was drawn to the weed stems, which in like manner were disposed of and imbedded in silken pellets. In their turn then came the red paper, a straw and sand bundle, placing them with the same scrupulous neatness. The bit of white paper was drawn to the side and fastened, and lastly the blue paper found a resting spot, all the material which I supplied having been used in embellishing the towering castle, which was now nearly an inch in height. Referring again to the plate illustration, *a*, shows a tube which penetrated ten inches of the soil; it was finished with a curious castle, having as an ornamentation on top two spikes of the bristly foxtail grass. The interior was slightly enlarged just within. A slight difference is shown in the tube *b*, the work of a larger spider with somewhat faded abdomen. As is often the case in old specimens, she had not exercised all her latent talents, for a few bits of twigs and a dilapidated leaf constituted her castle, scarcely raised above the ground. Quite a contrast is presented by the tube *c*, made by a younger individual. Her artistic culture was more freely displayed in an excellently built castle, which I have drawn as a separate illustration, Fig. 2. Surprising industry is shown in the length of the tube, nearly two feet. As if fortified against invasion the castle was adorned with a spike of nine prickly heads of burgrass; beside the side of the passage was also placed a cluster of burs almost touching the entrance.

At the margin a small twig was set on transversely, serving as a little stepping pillar on which the spider chose to climb in getting in and out. The tube *d* has the middle slightly enlarged, showing the ending of what was formerly the Summer quarters, while now it is continued down as a Fall or Winter extension. The spider found in the bottom of this cellar

was fully grown, measuring nearly three-quarters of an inch in length. Several castles are sometimes found naturally grouped near together, within a radius of twenty feet or thereabouts, but the tube last mentioned was isolated in a lonely field. The castle presented no special interest and will be passed over without further comment. It will be seen that the castle builder, unlike the known turret spiders, rarely builds the nest in a strictly pentagonal form, as has been frequently observed; for instance, in *Lycosa arenicola*. In the gradation between the young and older spiders' nests there is the widest diversity. Young specimens not infrequently build a perfect little tower, almost entirely of stones, and one I have in mind had nine such particles made into a compact edifice five millimeters high. The masonry was exquisitely put up, every stone bearing out true proportions, about the central opening of four millimeters diameter. Silk used as cement held the whole together securely.

I once saw a reflection of sombre forebodings when exposing an immature spider's tube; the light fell into the palatial cellar only to find it changed into a chamber of horrors, for instead of the spider a black insect like a nervous villain commenced jerking her wings of mourning like one in secret hiding bent on some treacherous mission. An orange spot on the upper part of her body, together with other markings, told the species, *Pompilus marginatus*.

Pompilus is figured in the plate illustration *a*, and from her position the inference may easily be imagined. When teased with a straw so her patience is sorely tried, the castle builder will stand her ground in self-defense and present as formidable a picture as can be supposed. She instantly responds to such threats with open jaws, at the same time raising up the two front pairs of legs high in the air. In this attitude she favors the conspicuous display of black under the outer three joints of the extremities, which in repose is not shown.

I succeeded in keeping specimens alive several years and discovered quite a number of interesting traits during this acquaintance well worth the care bestowed on them. Reserving the technical description for a separate article, I may add finally that the name *Lycosa domifex* is given to the species, whereby it may be known hereafter in scientific nomenclature.

THE PSYCHODIDAE OF THE PACIFIC COAST.

By Trevor Kincaid, University of Washington.

Through the kindness of the Rev. A. E. Eaton, the British authority on the Psychodidæ, the writer has been made acquainted with the classification of the family as accepted by European students. In Europe there are five genera, which are tabulated by Halliday in the following manner:

(a) With two simple nervures between the forked veins
  (b) Proboscis compressed, with maxillæ nearly as long. Wings pointed exactly at the end of the second simple vein. *Psychoda.*
  (bb) Proboscis with broad, pointing liplets Maxillæ obsolete. Labrum shorter than the labium.
  (c) Wings broad, ovate, with an upward bellying sinus in the middle in the male. *Ulomyia.*
  (cc) Wings even in both sexes. *Pericoma.*
(aa) With one simple nervure between the forked veins.
  (b) Hindermost vein not much shorter than the rest. Antennæ, with obconical joints, 14-jointed. *Trichomyia.*
  (bb) Hindermost vein abbreviated. Antennæ, with linear joints, 15-jointed. *Sycorax.*

To these five genera, a sixth, *Phlebotomus*, has been added. This genus seems to be more or less intermediate between Halliday's primary divisions of the family, since Mr. Eaton states that it has two simple veins between the forked nervures, but is otherwise more closely related to *Sycorax* and *Trychomyia*.

Mr. Eaton records forty-one species of Psychodidæ for the British Islands, distributed as follows: *Ulomyia* (1 sp.); *Pericoma* (32 sp.): *Psychoda* (6 sp.); *Trichomyia* (1 sp.); *Sycorax* (1 sp).

All of the North American Psychodidæ so far described have been placed under the genus *Psychoda*, but there is little doubt that part of these will be referred to *Pericoma*.

It is the purpose of the present paper to describe a number of new species of Psychodidæ from various points on the Pacific coast and to record certain notes in connection with species previously described. In the discrimination of the species in the group very little use has apparently been made of the ventral plate of the female. The writer believes that this structure is of great importance in this connection.

Psychoda pacifica Kincaid. Ent. News, VIII, 6.

This species, originally described from Seattle, seems to range along the whole Pacific coast, since representatives have been examined from Alaska, Oregon, eastern Washington and California, which, although varying in some respects from the type specimens, seem to be specifically the same. The Alaska specimens were secured by the writer during the summer of 1898 at Sitka, Unalaska and the Pribilof Islands in Bering Sea. The variety found upon the Pribilofs differs considerably from the type form. They are on the average much smaller than the latter; the antennæ are 14-jointed, owing to the absence of one of the small terminal articles, and the inferior appendages of the male genitalia are much more strongly curved towards the tip. The Unalaskan and Sitkan examples resemble the types quite closely, about the only difference being that the wings are more acutely pointed than is usual in the latter. The Oregon specimens were taken at Corvallis, Oregon, during the month of June, 1898, while the Californian examples were included in a collection of Psychodidæ sent to the writer through the courtesy of Mr. R. E. Snodgrass from the Leland Stanford Junior University. From Professor Charles V. Piper, of the Washington Agricultural College, four specimens of *P. pacifica* were recently obtained, which were collected at Pullman, Washington, the specimens being dated from July 12 to July 27, 1898.

Psychoda olympia Kincaid. Ent. News, VIII, 6.

This is a *Pericoma*. The posterior bifurcation is much nearer the base of the wing than is the anterior one; the wing is pointed exactly at the tip of the first simple vein.

Psychoda sigma, n. sp.

♀ Body yellowish white, clothed with cream-colored hair; wings ovate, apex obtusely rounded, more than twice as long as broad, clothed with cream-colored hair upon the veins, except an indistinct S-shaped band of black across the middle; fringe quite dense and long, cream-colored, except two patches of black at the anterior and posterior terminations of the S-shaped discal band; length of wing 2.5 mm. Legs yellowish white, clothed with cream-colored hair and scales. Antennæ longer than the width of the wing, 14-jointed, with verticillate whorls of cream colored hair upon the nodes; joints 1-2 small, closely united; joints 3-13 globular, separated by slender pedicles; joint 14 minute. Ventral plate yellowish, very narrow at base, broadening towards the apex, which is produced in two divergent lobes; ovipositor yellow, short, almost straight.

♂ Smaller than ♀, with the black band upon the wings less clearly evident. Genitalia conspicuous, brown, clothed with long cream-colored hair. Inferior appendages 3-jointed; joint 1 stout, cylindrical; joint 2 twice as long as 1, slender, slightly swollen at base, curving upwards; joint 3 very slender, cylindrical tapering at apex.

Superior appendages not as long as basal joint of inferior; 2 jointed; joint 1 short; joint 2 tapering to an acute point.

Habitat: Olympia, Washington. June 24 to July 1, 1897. Many specimens were collected on a wall shaded by hop vines.

Psycho'a schizura, n sp.

♀ Body whitish, clothed with gray hair on the thorax and silvery white on the abdomen. Legs whitish, becoming darker basally, clothed with white hairs and scales. Wing a little more than twice as long as broad, rather acutely pointed at the apex; hair upon the veins white and black, distributed in alternate patches, so as to give the surface of the wings a mottled appearance; well marked patches of black at the apices of the veins: fringe on posterior margin gray: length of wing 2.7 mm. Antennæ not as long as the width of wing, 15 jointed; basal joints not much larger than succeeding ones: joints 3-15 globular, separated by slender pedicles, which are about as long as the length of the nodes, each joint bearing a verticillate tuft of white hair. Ventral plate V shaped; ovipositor short.

♂ Smaller than ♀. Inferior appendages extremely long, 3-jointed: joint 1 stout, cylindrical; joint 2 almost twice as long as 1, enlarged at the base and tapering to the apex; joint 3 minute, clavate. Superior appendages as long as first joint of inferior, two jointed, tapering to an acute point.

Habitat: Seattle, Wash., August 13 to September 1, 1898. On windows.

Pericoma tridactila, n. sp.

♀ Body light brown, densely clothed with gray hair. Wings ovate, one and one half times as long as broad, apex moderately acute, clothed over the whole surface with gray hair, except an irregular band of white across the middle; fringe with basal third gray, remainder white, as long as the width of three cells; length of wing 2.5 mm. Legs light brown, clothed with gray hair and scales. Attennæ as long as the width of the wing, 16-jointed, with dense whorls of gray hair upon the nodes; joint 1-2 not larger than succeeding joints; joints 3-15 globular, separated by slender pedicles, which are slightly longer than the length of the nodes: joints 14-16 minutely, closely apposed. Ventral plate longer than broad, sides not emarginate, narrowing strongly towards the apex, which is bilobate.

♂ Genitalia conspicuous, clothed with gray hairs. Inferior appendages elongate, 2-jointed; basal joints stout, cylindrical, fused in the median line; second joint as long as first, straight, cylindrical, tapering to a rounded apex, and bearing at the tip three divergent, slender clavate processes, which are almost as long as the second joint itself. Superior appendages half as long as inferior, 2-jointed; joint 1 cylindrical, stout; joint 2 as long as first, slender, tapering to an acute point.

Habitat: Seattle, Washington, March 24 to June 15, 1898. Captured on a basement window.

In this species the bifurcations of the veins are so obscurely indicated that it was difficult to place generically; the anterior bifurcation is very close to the apex of the wing and the posterior one quite close to the base. The wings are folded roof-like in repose.

Pericoma sitchana, n. sp.

♂ Body black, clothed with gray hair. Legs black, clothed with gray hair and scales. Wings ovate, broadly rounded at the tip, the first simple nervure terminating just before the apex; bifurcations equidistant from the base of the wing; hair upon the veins mixed black and white, the black being most pronounced at the apices of the veins and at the bifurcations; length of wing 2.5 mm.; fringe gray, with a patch of white at the apex. Antennæ one-half as long as the width of the wing, 16-jointed; joint 1 cylindrical; joint 2 large, globular; joints 5-16 globular, separated by very short pedicels, the nodes sparsely clothed with gray hair. Gentalia not conspicuous, black, clothed with gray hair.

Habitat: Sitka, Alaska, July 12, 1897.

Pericoma triloba, n. sp.

♀ Body brown, densely clothed with gray hair. Wings broadly ovate, not quite twice as long as broad, apex distinctly pointed, exactly at end of first simple nervure, clothed with gray hair upon the veins; fringe dark gray; length of wing 3 mm.; posterior bifurcation much nearer the base of the wing than the anterior one. Legs brown, clothed with gray hair and scales. Antennæ one-half as long as the width of the wing, not much longer than the maxillary palpi; 17-jointed; joint 1 moderately large; joint 2 extremely large, subglobose towards apex, clothed with scattered whorls of long gray hair; joint 17 minute. Ventral plate broad at base emarginate laterally and terminating in three distinct lobes; ovipositor yellow, slightly curved.

♂ Gentalia inconspicuous, very hairy. Inferior appendages 2-jointed; joint 1 large and stout; joint 2 short, cylindrical, curving towards the apex, which is broadly and obliquely truncate. Superior appendages 1-jointed, short, straight, tapering from the base to an acute point.

Habitat: Seattle, Washington. Numerous specimens were secured in a railroad culvert situated on the campus of the university, March 12 to June 1, 1898.

Pericoma variegata, n sp.

♀ Body black, clothed with white hair, except a small patch of black hair near the base of the wing. Legs black, clothed with black and white hair. Wings rather acutely rounded at the tip, more than twice as long as broad; hair upon the veins deep black,

except upon a broad transverse band near the base and an outwardly curved row of small patches just beyond the middle, which are white; fringe both on anterior and posterior margin, with alternate patches of white and black hair; length of wing 2.8 mm. Antennæ black, as long as the width of the wing, 17-joints; joints 1-3 stout, cylindrical, densely hairy; joints 4-17 small, fusiform, thinly clothed with long white hair. Ventral plate brown, shallowly emarginate at apex; ovipositor brown, rather long, almost straight.

Habitat: Seattle, Wash. Swept from bushes May 8, 1898.

Pericoma bipunctata, n. sp.

♀ Body brown, clothed with white hair. Legs brown, clothed with white hair, some of the latter being long. Wings broadly rounded at the tip, about twice as long as broad, clothed upon the veins with white and black hair, the black most pronounced at the apices of the veins and upon the bifurcations, the white most evident near the base and towards the apex, where there are small, irregular patches of this color; fringe black, except a spot extending from the apex of the third longitudinal vein to the end of the seventh and a small patch between the eighth and ninth vein, which are white; bifurcations equidistant from the base of the wing; 17-jointed; joint 1 rather large, cylindrical; joint 2 broader than 1, globular; joints 3-17 fusiform, clothed with scattered white hairs; joints 3-4 bear dorsally a row of strong erect black setæ. Ventral plate squarely produced, slightly emarginate at apex.

♂ Gentalia conspicuous, black, clothed with white hair.

Habitat: Seattle, Wash. (1♂); Santa Cruz Mountains, Cal. (1♂; 1♀); from the collection of Leland Stanford Junior University.

Pericoma furcata, n. sp.

♀ Body brown, clothed with white hair, among which a few black hairs are scattered. Wing twice as long as broad, narrowly rounded at the apex, which is pointed between the simple veins; veins clothed with black and white hairs as follows: Two curved rows of prominent black tufts across the middle of the wing, between which the hair is principally white; the area between the outer row of black tufts and the apex of the wing principally with black hair; area between the inner row of black tufts and base of wing, with mixed black and white hair; fringe black, with white tufts at apices of all the veins; bifurcations equidistant from the base of the wing; length of wing 2.8 mm. Antennæ as long as the width of the wing, 16-jointed; joints 1-2 slightly larger than the succeeding ones; joints 3-16 swollen at base and bearing loose tufts of black hair. Legs with alternate annulations of black and white hair. Ventral plate dilated basally, and strongly produced in the middle, the production bilobed and angularly emarginate at apex; ovipositor moderately long, almost straight.

Habitat: Pullman, Wash. Collected by Mr. R. W. Doane, of the Washington Agricultural College,

Pericoma truncata, n. sp.

♀ Body brown, densely clothed with mixed white and dark brown hair. Wings ovate, broadly rounded at the tip, not quite twice as long as broad; hair upon the veins principally dark brown, with a rather large patch of white near the middle of the wing and its apex; fringe dark brown, on posterior margin as long as the width of three cells and with small patches of white hair alternating with the brown tufts at the apices of the veins; bifurcations of the veins equidistant from the base of the wing; length of wing 4 mm. Legs brown, clothed with brown hair and scales, interspersed with a few longer white hairs. Antennæ black, not quite as long as the width of the wing, 17-jointed; joint 1 rather large, cylindrical; joint 2 large, globose; joints 3-16 fusiform, covered with scattered hairs; joint 17 minute; ventral plate longer than broad, broadly truncate at the apex; ovipositor yellow, long and slender, strongly curved.

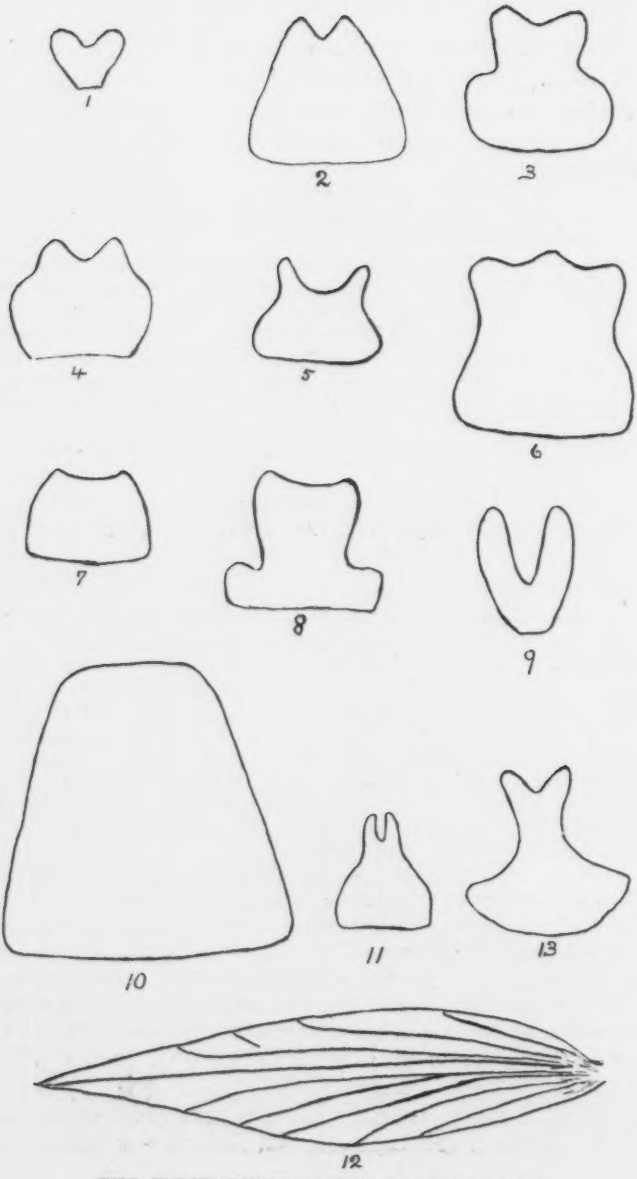
Habitat: Palo Alto, Cal. From the collection of the Leland Stanford Junior University. Collected by Mr. R. E. Snodgrass.

Sycorax lanceolata, n. sp.

♀ Body brown, clothed with brown hair, which appears black in some lights. Wings extremely narrow, four times as long as broad, apex sharply acuminate and pointed exactly at the tip of the single simple nervure; anterior and posterior bifurcations distant from the base of the wing, respectively, two-thirds and one-third the wing's length; veins unevenly clothed with brown hair, similar to that upon the body; fringe very heavy, colored similarly to the hair upon the veins, on the posterior margin somewhat shorter; length of wing 2 mm. Legs brown, clothed with brown hair, except on the basal joints of all the tarsi, which are covered with white hair Antennæ short, stout, about three-fourths as long as the width of the wing, 15-jointed; joint 1 cylindrical; joint 2 globose, larger than succeeding joints; joints 3-15 linear and sparsely clothed with brown hair. Ventral plate elongate, broad at the base, and narrowed towards the apex, which is bilobed and linearly emarginate.

Habitat: Palo Alto, Cal. August 3, 1898. One specimen; Santa Cruz Mountains. August 9, 1895. Three specimens; collection of the Leland Stanford Junior University. Almota, Wash. Ten specimens, collected by Mr. R. W. Doane, of the Washington Agricultural College.

This interesting species belongs to Halliday's second division of the Psychodidæ, containing genera with a single simple



THE PSYCHODIDÆ OF THE PACIFIC COAST.

vein between the forked nervures, and since it agrees in every essential generic character with Sycorax it has been referred to that group, although a comparison with the European material may necessitate the erection of a new genus for its reception.

EXPLANATION OF PLATE.

Figs. 1–11. Ventral plate of Psychodidæ. (1.) *Psychoda sigma*, n. sp. (2.) *Pericoma tridactyla*, n. sp. (3.) *Pericoma olympia* Kinc. (4.) *Psychoda pacifica* Kinc. (5.) *Psychoda elegans* Kinc. (6.) *Pericoma triloba*, n. sp. (7.) *Pericoma variegata*, n. sp. (8.) *Pericoma bipunctata*, n. sp. (9.) *Pericoma schizura*, n. sp. (10.) *Pericoma truncata*, n. sp. (11.) *Sycorax lanceolata*, n. sp. Fig. (12.) Wing of *Sycorax lanceolata*, denuded of hair to show venation. (13.) Ventral plate of *Pericoma furcata*, n. sp.

ON TWO NEW AND ONE PREVIOUSLY KNOWN FLEA.

By C. F. Baker, Auburn, Ala.

Pulex howardii Baker. In the group which includes this flea and *fasciatus* and its allies, the males determine the species. For this reason *wickhami* and *gilletei* are not well founded. They were separated on characters whose values could not have been correctly estimated at the time. They should be reduced to synonyms of *howardii*.

Pulex irritans, var. **dugesii**, n. var.

Dr. Duges has sent me a flea taken on *Spermophilus macrourus* at Guanajuato, Mex., which agrees very closely in its characters with *P. irritans*, but is smaller, paler and the legs are more slender. In these particulars it approaches *pallidus*, but the male claspers are large and half oval, and the mandibles about equal the fore coxæ. Named for its discoverer, who has been diligently investigating the Mexican Siphonaptera for many years.

Hystrichopsylla americana, n. sp.

♀ Length 3.25 mm. A typical *Hystrichopsylla*, and closely resembling *obtusiceps*. Color deep chestnut brown. Head not angulated in front above, but evenly rounded from occiput to mouth. Head comb not perpendicular, as in *obtusiceps*, but on lower margin of head, and consisting of fourteen spines on each side. Pronotal comb of about fifty small, slender, close-set teeth. First abdominal segment only with a comb of about forty teeth. Abdomen very heavily bristled, as in *obtusiceps*. Seventh dorsal segment with ten

large, very long, black spines on posterior border, which surpass apex of abdomen. Bristles on joint 2 of antennæ exceeding joint 3 in length. All tibiæ heavily armed on posterior margins with very numerous, long, stout, black spines. Tarsi slender; proportional lengths of tarsal joints as in *obtusiceps*. The posterior apical spines on hind tibiæ and first and second joints of hind tarsi are in each case longer than the succeeding joint.

Described from a single female received from Prof. F. L. Harvey and taken on *Evotomys* at Orono, Me. The specimen may not be quite mature.

I have seen a flea from *Haplodon* of remarkable structure and great size, which may have been an *Hystrichopsylla*. The single specimen which came into my hands was destroyed by an accident in the laboratory.

The occurrence of this peculiar genus in America is a matter of the greatest interest. The fact of its coming from an animal that has lived beside walks trodden by our entomologists for many years shows how the Siphonaptera have been neglected, and indicates the fertility of a field easily worked. An opportunity for a piece of splendid work is open to collectors of mammals and those interested in hunting. Such persons could easily do more than any others towards building up our knowledge of the Siphonaptera of America, and that by simply saving what actually passes through their hands. The only apparatus needed is small vials of alcohol and tweezers. It should be borne in mind that all species should be collected in *large* series, and everything must be carefully labeled.

A NEW CONOCEPHALUS.

By LAWRENCE BRUNER.

Conocephalus atlanticus n. sp.

Grass green, very rarely flecked with dusky spots, moderately slender, with rather short wings and long ovipositor.

Fastigium of the vertex short, a trifle longer than broad, rounded in front and furnished below with a blunt tooth at base. It is bordered above at sides and in front by a yellowish line, below which it is more or less heavily marked in front by a transverse line of black. Pronotum usually with lateral carinæ yellowish, the disk flattened, quite coarsely punctate and granulate; the lateral lobes with anterior and posterior angles rounded. Tegmina extending beyond the apex of the hind femora from one-fifth to one-third their length, their tips acuminately rounded. Femora of front and middle legs below with 0-3 spines, those of hind legs with spines

on both sides. Tibiæ of all more or less infuscated. Ovipositor rather long and slender, as long or longer than the body, a little curved near the base. Antennæ rufous, becoming infuscated apically.

Length of body, male, 24-27 mm., female, 26-28 mm.; of fastigium, male, 1.4 mm., female, 1.6 mm.; of pronotum, male, 7.2 mm., female, 6.7-7 mm.; of tegmina, male, 33 mm., female, 28-36 mm.; of hind femora, male, 19 mm., female, 19-21 mm.; of ovipositor, 29.5-31 mm.

HABITAT.—New Jersey, Philadelphia neck, Pa. (J. B. Smith); Maryland, Virginia (Bruner); Virginia (Pergande).

This insect approaches the *C. gladiator* Redtenbacher in the length of its ovipositor and wings, but differs from it in other respects. It is too small for *C. dissimilis* Serv. and has to short hind legs to be placed with C. retusus Scudder, while *C. obtusus* Burmeister seems to be an insect with a much shorter ovipositor. Described from 14 specimens.

PHYSIOLOGICAL SPECIES AGAIN.

JOHN H. LOVELL, Waldoboro, Maine.

In an editorial in THE NEWS for November, 1897, the editor tells of a strange tune sung (?) by a Cicada along the Jersey shore, and raises the query: "Is there such a thing as physiological species?" In the December number Prof. Cockerell expresses his belief in such species and advises naturalists to be on the watch for them, while in the succeeding issue Mr. Robertson asks why the term physiological species is used and requests examples.

Let us broaden the question to include all animal and plant life, and ask: "Do systematists ever constitute species on physiological characters alone?" Unquestionably they do and numerous instances can readily be given. Prof. Farlow, than whom we can have no better authority, says in his recent article on "The Conception of Species": "We cannot fail to notice the increasing tendency among cryptogamic botanists to give more and more weight to physiological characters in limiting their species." "One who takes up the recent descriptive works on Uredinaceæ is surprised to see the number of species which depend on physiological characters." "The tendency to split up species on physiological grounds becomes more and more marked." "The explanation is to be sought in the fact that descriptive botany in certain groups of plants

has reached a point where the ordinary morphological characters no longer suffice to classify what we know or wish to know about the plants themselves." "We also feel warranted in believing that hereafter physiological characters will assume even a greater importance than at present in the characterization of species."

Anyone who is familiar with the systematic literature of botany knows how difficult it is to distinguish species even among the higher forms of plants on morphological grounds alone. The varieties of one botanist are apt to become the species of another; while both species and genera are transferred back and forth in a most astonishing manner. Dr. Gray once expressed the opinion that not more than one-third of the described species of oak were valid, and in one of his letters writes that the asters threatened to reduce him to blank despair. A well known authority in reviewing a recent work on grasses declares that six or eight good and valid species have been compressed into a single polymorphous one. The fact is that if minute differences were to be noted every plant would represent a species. Something like this seems really to have happened in the case of the genus Sphagnum in regard to which a European bryologist remarks, *Sit brevius dictum*; "*Tot specimina, quot nomina.*"

—o—

MISCOPHINUS OR HYPOMISCOPHUS?—It turns out that *Miscophinus* Ashm., ENTOMOLOGICAL NEWS, October, 1898, is identical with *Hypomiscophus*, Ckll., Ann. Mag. Nat. Hist., October, 1898. Dr. Skinner cannot find out just when the October ENTOMOLOGICAL NEWS appeared, but he states that it "is usually mailed on or before the last day of each month." Messrs. Taylor and Francis inform me that the October Annals and Mag. of Nat. Hist. was issued to the public on September 30th, at 8.30 a. m., which would be about 2.30 a. m. in Philadelphia. Such are the facts, and they leave us still in uncertainty. Unless more light is forthcoming, I am inclined to favor the use of *Miscophinus*, as Ashmead described three species under it, while my *Hypomiscophus* was based on a single species.—T. D. A. COCKERELL.

P. S.—Mr. Ashmead kindly informs me that his copy of ENTOMOLOGICAL NEWS containing *Miscophinus* was received on the morning of the first of the month, and he read it at the breakfast table. It must therefore have been mailed on September 30th, and owing to the difference of longitude, the London publication has priority of several hours.—T. D. A. C.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer for each number three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., FEBRUARY, 1899.

SOME time ago an appeal for assistance to advance the interests of entomology was asked from a very wealthy woman in this city, and such assistance declined, on the ground that "she had never wavered from a dislike to amateur collections of insects immolated on pins and whose long suffering no one could realize." Now this all raises the question as to whether the lady is correct in her ideas on the subject. Even if entomologists did immolate live insects on pins, it is probable that they would not suffer pain, but as a matter of fact they are killed before being pinned, as otherwise they would be ruined as specimens. While insects do have sensory nerves, they are probably by no means as well developed as the motor nerves, which are essential in such active creatures. In the higher orders of animals and those which bring forth few young, pain is necessary to protect life, and the loss of this protection in insects is compensated for by fecundity. There are also direct experiments to prove that insects do not suffer pain. It is said that a dragon-fly will eat from the end of its abdomen as far as it may be fed to it. Also if the same insect be deprived of its abdomen and supplied with one of wax of the same size and weight, the insect will go about its business and pursue mosquitos for food as though its anatomy had not been abbreviated. The nocturnal moths are also very tolerant of pins thrust through them in day time, but when night comes they endeavor to depart, pin, tree and all, if pinned to the latter. The writer has been accused of cruelty by lady friends in starving to death the large bombycid moths, which by the way, have no mouth parts and only feed in the larvæ condition. When our lady friends cease to wear sealskin coats, the plumage of beautiful birds and have the tails of their horses less like effete dust brushes, we will be willing to hear from them on the subject of cruelty to insects.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

NOTICE.—Will correspondents kindly note that my address is now MESILLA PARK, New Mexico (Not Mesilla nor Las Cruces)?—T. D. A. COCKERELL.

"THE regents of the University of New York have appointed Dr. Ephraim Porter Felt, State Entomologist. In the autumn of 1896 he was appointed Assistant State Entomologist under the late Dr. Lintner. The tenth to the twelfth Reports of the State Entomologist were issued after his connection with the office."

ADMIRAL DEWEY, it seems, is a great collector of butterflies, in addition Spanish vessels and other bric-a-brac.—*Philadelphia Ledger.*

Remark.—If Admiral Dewey handles his specimens the way he did the Spanish fleet, he would not receive much in exchange for his duplicates. However, we are pleased to learn that he is an entomologist.—EDS.

A NOTE ON COPULATION AMONG ODONATA.—The statement that in pairing the male dragonfly grasps the female by the prothorax or neck seems to have been generally accepted. While this is true for Agrionidæ, so far as I have had opportunity of observing, it is possibly not true for Æschnidæ and Libellulidæ—certainly not true for all of them. During July, 1898, while collecting about Round Lake, in Northern Indiana, a pair of *Celithemis fasciata* was taken, and the male was found to be grasping the female *by the head*, the inferior appendage covering the occiput, while the superior appendages rested against the rear of the head. In this case I held the pair in my fingers and separated the male from the female. Although unable to make so positive an observation in any other case, by carefully approaching pairs of *Celithemis elisa*, *C. eponina* and *Mesothemis simplici collis*, as they erested on the grass and sedges, I was able to determine, in the case of these three species also, that the female was grasped by the head. The structure of the parts involved might indicate that this habit belongs to all the Æschnidæ and Libellulidæ.*

A comparison of the actions of *Enallagma signatum* and *Celithemis fasciata* while pairing and ovipositing is interesting. In flight when the male *Enallagma* is carrying the female, grasping her by the prothorax, the legs of the latter are drawn up close to the body, and, while resting in copulation, they usually hang extended on either side of the abdomen of the male, or they may remain in their original position, folded to the body. While ovipositing the male

* In my collection is a pair of *Aeschna constricta* Say, taken in copula, October 1, 1893, in Delaware County, Pa., by myself, killed and pinned in the copulatory position. The appendages of the male grasp the head of the female in the manner above described by Mr. Williamson.—P. P. CALVERT.

and female are usually submerged, the male grasping the female and both clinging to some aquatic plant in which the eggs are being placed. In the case of *Celithemis fasciata* in flight the male grasps the female by the head, the legs of the latter hanging extended. In copulation the abdomen of the male is grasped by all the legs of the female, or the second and third pairs of legs may grasp the abdomen of the female herself. In ovipositing the male and female hover and flit about "in couple," the female frequently touching the tip of her abdomen to the water.—E. B. WILLIAMSON, Carnegie Museum, Pittsburgh.

Allorhina nitida Linn. AS A FRUIT PEST.—I do not remember to have seen a mention of this insect as a fruit pest. I recently received a number of the beetles from Mr. George F. Breninger, who obtained them at Phœnix, Ariz., and writes concerning them as follows: "They are the most destructive insect on fruit I have ever seen. They begin with the first peaches that ripen and continue until about the first of October, when they disappear. I have seen so many on a peach as to completely hide it, and they go to the ground with much buzzing when the fruit drops. You will notice the cutting apparatus on the top of the head with which it digs up the flesh of the fruit. It also feeds to some extent on melons and tomatoes."—C. P. GILLETTE.

Is *Ceratomia catalpæ* spreading northward? In the November number of THE NEWS (page 231) this southern species is recorded from Delaware County, Pa. In 1893 I received through Prof. Beekwith, then of Delaware College, two specimens of this moth from Sussex County, Del., and in 1894, in a large quantity of electric light material taken in this city (Wilmington, Del.), I found a single specimen; but this year the larvæ have appeared on the catalpa trees in great numbers, and the moths were not rare at the lights: so that in this State *Ceratomia catalpæ* appears to have spread northward, and has certainly greatly increased in numbers, where it was formerly very rare.—FRANK M. JONES, Wilmington, Del.

GRASSHOPPERS IN NEW MEXICO.—This year (1898) we have had quite a plague of grasshoppers in the Mesilla Valley. The species concerned were all residents. The principal offender being *Melanoplus differentialis*, with *M. femur-rubrum* a fair second. *M. aridus* was common, but seemed to restrict itself almost entirely to the native grasses. The interesting feature of the attack was that it was not participated in by three Melanoplini (I prefer this term for the tribe to Melanopli), which were very common in the immediate vicinity. *Melanoplus herbaceus* occurred in immense numbers on the *Pluchea borealis*. *Æoloplus elegans* was equally abundant on *Atriplex canescens*, while *Hesperotettix viridis* was quite common on *Bigelovia* (or *Ioscoma*) *heterophylla* var. *wrightii*. Each of these species is colored like its food-plant, and never by any chance leaves it for the cultivated fields.

At Tularosa, N. M., this fall, I was surprised to find great numbers of a *Melanoplus* quite new to me, allied to *M. bivittatus*. It proves to be *M thomasi:* (Scudd. Revis, Melanopli, p. 368,) a species only known hitherto by a single male captured by Bruner in the State of Durango, Mexico! Its habits are quite like those of *differentialis* and *bivittatus*, so it will undoubtedly prove injurious. The specimens were taken in the yard at the back of the hotel, where grape vines and fruit trees were cultivated The genuine *M bivittatus* is common enough in New Mexico in the Transition Zone, as at Santa Fe, but is never seen at the lower levels.

T. D. A Cockerell.

Megetra vittata injuring sugar beets.—Now that so much interest is being taken in sugar beets, it may be worth while to record that Mr. C. E. Mead sent me two specimens of this curious Meloid on Sept. 3, with the information that they were injuring sugar beets at Aztec, N. M. The specimens differ slightly from the form of the insect found in the Organ Mts , N. M., in that the dull orange marks on the elytra are confined to the subcostal region, instead of forming a well marked network covering the greater part of the elytra T. D. A. Cockerell.

We are accustomed to hear of large spiders coming from tropical regions in bunches of bananas. The ordinary statement about these spiders is that they are "tarantulas." The genuine "tarantulas" belong to the family Theraphosidae, and the known habits of these spiders are not such as would lead one to suppose that they would seek shelter in banana bunches. "Tarantulas" are ground spiders and rarely climb trees. So it is not surprising that the large spiders found occasionally in bunches of bananas prove to belong to quite different groups.

During the past few years I have had several large spiders sent me that were taken from bananas. These spiders belong to two species. The larger and heavier one is *Ctenus ferus* Perty. The family Ctenidæ is a small one, and by most arachnologists considered close to the common Lycosidæ. They are wandering spiders, making no web, and are often found on trees Two species occur in our Southern States This particular species was first known from Brazil, but is now known to inhabit various parts of South and Central America. It has been sent me from Albany, N. Y., New York City, Ft. Collins, Colo., and lately I have seen a specimen from Corvallis, Ore. It has stout jaws, long legs and a hairy body, so it is probable that most of the "tarantulas" from bananas are referable to this species

The other spider sent me as occurring among bananas is *Heteropoda venatoria* Linn , the so-called huntsman spider, a common inhabitant of all tropical countries. Specimens have been seen from New York City and Corvallis, Ore. This spider belongs to the family Sparassidæ, closely related to the Thomisidæ. They spin no

webs, but wander in search of prey This species is quite flat, and has very long legs. The female carries her egg-sac under the body. Nothing is known regarding the poisonous qualities of these spiders, but they are probably much less dangerous than the true "tarantulas." NATHAN BANKS.

AN APPEAL IN BEHALF OF ENTOMOLOGY AND KINDRED SCIENCES. – In the interest of entomology, it would be a good plan if every entomologist in the United States would petition their representatives in Congress to have paragraph 666 of the tariff law of 1897 amended, so that specimens of natural history for scientific collections be admitted free of duty, whether intended for private or public use. The paragraph in question comes under the free list, and reads as follows: "Specimens of natural history, botany and mineralogy when imported for scientific public collections, and not for sale."

A law that tends to discourage private scientific research in natural history should be blotted out immediately, as it is a disgrace to a civilized nation. Entomology, especially, merits all the encouragement possible, and one of the best ways of helping the cause would be to remove the barrier from the private student. All who read this are earnestly requested immediately to petition their representatives at Washington, urging that the section in question be amended, and that without delay. EDWARD A. KLAGES.

NOTES ON THE REMOTEST CORNER OF MEXICO.—At present the northern part of the State of Guerrero is considered to be the least known district of the republic. Lying between the route from Toluca to Colima and the old road from Acapulco up to Chilpancingo and Mexico City, it is almost untraveled. On account of the long dry season it is but little cultivated, and the hills are sparsely covered with stunted trees. The altitude ranges from 1,000 to 2 000 feet, with "cerros" of 3,000 to 5,000 feet. The numerous gold and quicksilver mines of the region and the "Gran Pacifico" railroad, which is building, will soon bring the country into prominence.

Though at the present time [Dec., '98] the dry season is only fairly begun, the apparent insect fauna is hardly 5 per cent. of that of the rainy season. There is still a good variety of Orthoptera, especially Locustidæ and Gryllidæ. Odonata are, of course, to be found along the Rio Mescala and Rio Cocula; Gomphinæ not met with. Tarantulas still prowl and scorpions still lurk. The wood-boring Coleoptera "hold their own" in the narrow timber strips along the rivers; but all the Phytophaga are hibernating. Of Diptera and Lepidoptera there is left scarcely a trace. A hot desolate country just now, but one of the most interesting corners of the neotropical region *when it rains*—O W. BARRETT, Tacubaya, D. F., Mexico.

IN Mr. Welles' article (Destructive Work of Daremma Catalpæ), in your December number, the mention of unusual abundance

of Deilephila lineata larvæ calls to mind a similar occurrence in this section in 1897, which, judging from reports from other localities in the great western dry belt at that time, was probably of far-reaching extent. From even as far south as the Rio Grande Valley came a newspaper report, with the usual journalistic coloring, saying that millions of large striped worms, large as a man's finger, each with a horn on the end of its tail, were marching across the country in a body. These worms had never been seen there before, and no one could classify them. They did not stop nor turn back when they came to the Rio Grande River, but deliberately took to the current, and those that were not swept away continued the line of march from the other side. This of course, is the reporter's sensational description of an extraordinary appearance of some sphingid caterpillar, possibly that of D. lineata.

While I was engaged in netting Catocalas about a wooden station building of the railway at Green River, Utah, in August of the same year, a resident who observed me ventured the information that I should have been there in June, "for the whole desert was then alive with big green striped worms."

The foot hills about Salt Lake City were, during the same period, over-run with countless myriads of the larvæ of D lineata. They always preferred as food plant *Clarkia rhomboidea*. *Rosa fendleriana* and *Salix longifolia*. During the previous year (1896) these larvæ were quite uncommon, but the moths were abundant I remember counting thirty of the latter about a single electric lamp at one time, but during the season just past (1898) I failed to find a single larva of this species, and but very few of the moths.—G. Wesley Browning, Salt Lake City, Utah.

The remarks in the December number of The News, about the prevalence of the different species of *Pieris*, interested me very much, because I find among my field notes some observations of the same nature.

In 1895 P. oleracea was everywhere in the vicinity of Salt Lake City, from the bottom of the valley to the neighborhood of nine or ten thousand feet above sea level. Since that time it has steadily decreased until, during the last season, it has been almost a rarity here, and as it has disappeared, P. rapæ, which was not abundant in 1895, has increased prodigiously. P. protodice, so far as I can judge, has remained of about the same numbers, being every year common but at no time specially plentiful. I have often wondered what are the conditions that govern the limitations of these species.—G. Wesley Browning, Salt Lake City, Utah.

Note on Chrysophanus helloides.—In 1895 I received from Utah some specimens of *Chrysophanus helloides*, and in September of the same year took at Roby, Ind., 7 specimens of what I at the time of capture thought was *C. hypophleas*. When spread I com-

pared them with my cabinet specimens and found them to be C. helloides. On reporting this to some collectors who had been interested in this (Chicago) field for upward of 25 years, I was surprised to learn that the species had never been reported so far East An inquiry through the columns of THE ENTOMOLOGICAL NEWS brought the information that its furthest previous Eastern appearance had been in Western Nebraska.

I notified all the Chicago collectors to be on the lookout for it in 1896, with the result that it was reported from all parts of the district, and both in the spring and fall It is now found throughout the summer, as I have this year taken it in each month from May to September.

Last fall, in making exchange with a Minneapolis, Minn., collector, I received a lot of Chrysophanus sp.? and at the same time a request for *C. helloides*. In the lot received from my correspondent were *nine* specimens of *helloides*, thus establishing a new locality for the species. It seems to be spreading eastward, and I would like to hear from any one noting its occurrence further East or South than Chicago.—JOHN L. HEALY, Sec. Chicago Entomological Society.

Entomological Literature.

COMPILED BY P. P. CALVERT.

Under the above head it is intended to mention papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South). Articles irrelevant to American entomology will not be noted. Contributions to the anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in HEAVY-FACED TYPE refer to the journals, as numbered in the following list, in which the papers are published; * denotes that the paper in question contains descriptions of new North American forms. Titles of all articles in foreign languages are translated into English; usually such articles are written in the same language as the title of the journal containing them, but when such articles are in other languages than English, French, German or Italian, this fact is indicated in brackets.

4. The Canadian Entomologist, London, Ont., Dec. '98.—**5.** Psyche, Cambridge, Mass., Jan '99.—**7.** Bulletin No. 18, new series, U. S. Department of Agriculture, Division of Entomology, Washington, '98.—**9.** The Entomologist, London, Jan. '99.—**11.** The Annals and Magazine of Natural History, London, Dec. '98 —**21.** The Entomologist's Record, London, Dec. 15, '98.—**22.** Zoologischer Anzeiger, Leipsic, Dec. 12, '98.—**33d.** Denkschriften, kais Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Classe, lxiv, Vienna, '97.—**33s.** Sitzungsberichte of same.—**84.** Insekten Börse, Leipsic, '98.—

99. Bulletins. Cornell University Agricultural Experiment Station, Ithaca, N. Y., Dec. '98.

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Diptera.—Brauer, F. Contributions to the knowledge of the Muscaria schizometopa and description of two species of *Hypoderma*, 1 pl., 33s, cvi, 4-7, April-July, '97. Rec'd Dec. 20. '98.—Coquillett, D. W. See Economic Entomology.*—Kellogg, V. L. The mouth parts of the nematocerous Diptera, i, 5.—Scudder, S. H. See Hemiptera.

Lepidoptera.—Bacot, A. Notes on hybrids (2nd and 3rd crosses) between *Tephrosia bistortata* and *T. crepuscularia*, 21.—Butler, A. G. On the Pierine butterflies of the genus *Catophaga*, II; Notes on the genus *Euchloe* Hübner, a genus of the Pierinæ, 9.—Chapman, T. A. A note on the action of the clasps in *Erebia*, 21.—Chittenden, F. H. A leaf tyer of grape and elderberry, 7.—Dod, F. H. W. Notes on some Alberta butterflies, 4.—Dyar, H. G. Life-histories of North American Geometridæ, 5.—Merrifield, F. and others. Protective coloration of Lepidopterous pupa, 21.—Moore, F. Lepidoptera Indica. Part xxxiv. London, Lovell Reeve & Co. '98. Rec'd Jan 9, '99. (Vol. iii, pp. 193-216, pls. 263-270. Nymphalinæ-Limenitina).—Ruhmer, G. W. How does *Araschnia levana* ab. *porima* O. arise in nature? Entomologische Nachrichten, Berlin, Dec. '98.—Sherborn, C. D. and Durrant, J. H. On the dates of Jacob Hübner's "Sammlung europäischer Schmetterlinge," II.—Skinner, H. A Synonymic Catalogue of the North American Rhopalocera. The American Entomological Society. Philadelphia: issued Dec. 15, '98. Pp. 100, xiv. See THE NEWS for January, page 21.—Smith, J. B. Descriptions of new Noctuids,* 4.—Soule, C. G. Early Stages of *Triptogon modesta*, 5.

Hymenoptera.—Ashmead, W. H. Classification of the horntails and sawflies, or the sub-order Phytophaga, 7 (concl.), 4.—Anglas, J. On the histolysis and histogenesis of the digestive tube of Hymenoptera during metamorphosis, Comptes Rendus, Société de Biologie, Paris, Dec. 17, '98.—Anon. An invasion of the digger wasp [*Megastizus speciosus*], 7.—Cockerell, T. D. A. New and little known Hymenoptera taken by Prof. C H. T. Townsend and Mr. C. M. Barber in New Mexico in 1898.* II; Notes on the nomenclature of some Hymenoptera, 9; Some synonymy, [and] Segregates from *Perdita*, 5.—Marlatt, C. L. Some new Nematids,* 4.

DOINGS OF SOCIETIES.

At the December meeting of the Feldman Collecting Social, nine members were present. Mr. H. Wenzel, on behalf of Dr. Griffith, read a communication on the coleopterous fauna of the Salt River Valley, Arizona. The northern fauna commingles with the Sonoran of Mexico. The paper contained a list of five species of Cicindelidæ and seventy-four species of Carabidæ taken by Dr. Griffith.

Dr. Smith referred to a change of faunas due to the introduction of sheep. On one side of a wire fence the lower anstial fauna of the region existed, whereas on the opposite where the sheep pastured was the common widely distributed fauna of the United States.

He also exhibited some advance sheets of his forthcoming new edition of the "Catalogue of the Insects of New Jersey," pertaining to the Othoptera. The new list will contain 142 species of this order against 114 in the old, and every species has a definite record, whereas in the old list many records were merely guess work. The same large percentage of increase was shown in the other orders. He further stated that some specimens of *Conocephalus* recently taken in the "Neck," Philadelphia, had proven to be *C. gladiator* Redt. heretofore only known to occur in Texas and Mexico.

Mr. Johnson exhibited a specimen of *Cicada septemdecem* taken at Edge Hill, Montgomery county, in June last by Mr. H. S. Viereck. It evidently represented brood seventeen due in this State in 1898, but the speaker had observed no specimens himself.

Dr. Smith said the brood due in New Jersey this year 1898 was peculiar in its distribution; it crossed the state diagonally from Trenton and then struck northward, though small isolated broods occurred at Vineland and near New Brunswick.

WM. J. FOX, Secretary.

At the annual meeting of the American Entomological Society held December 22, 1898, the following were elected to serve as officers for the year 1899: President, Henry C. McCook; Vice President, C. W. Johnson; Treasurer, E. T. Cresson; Recording Secretary, Henry Skinner; Corresponding Secretary, W. J. Fox; Curator, Henry Skinner; Librarian, W. J.

Fox; Publication Committee, E. T. Cresson, C. F. Seiss, B. F. Smith; Executive Committee, P. Laurent, Chas. Liebeck, H. W. Wenzel; Finance Committee, J. W. McAllister, C. S Welles, C. C. Cresson. HENRY SKINNER, Secretary.

At a business meeting of the Entomological Section of the Academy of Natural Sciences of Philadelphia, held December 22, 1898, the following were elected to serve as officers for the present year: Director, Philip Laurent; Vice Director, H. W. Wenzel; Treasurer, E. T. Cresson; Conservator, Henry Skinner; Recorder, Henry Skinner; Secretary, W. J. Fox.

HENRY SKINNER, Recorder.

THE WASP AS AN ENGINEER.

Several members of the United States Engineer Corps were witnesses recently of a feat of insect engineering near the road on which they were working. One of their number found a blue ground wasp dragging along the ground a dead swamp spider one-quarter the size of a full-grown tarantula. Whether the wasp killed the spider or found it dead is a question beyond solution. He was having a hard time dragging his prey along, and presently left it to go prospecting for his abode. The discoverer of the wasp called his companions, and one of them in coming stepped upon the wasp's ground hole, crushing down some blades of dried grass across it. This caused no little trouble to the insect, who, upon locating the hole, nipped away at the obstructing stalks with his strong mandibles until he had cleared a passage. Then he went back and sized up the spider, walking around the big body and surveying it from all sides.

"He's reckoning that the hole isn't big enough," said one of the engineers.

"That's all right; he'll fix it," said another, as the insect went back and began vigorously widening the entrance to his domicile.

Again he returned to the spider, seized it and dragged it to within a foot of the orifice. To the spectators it was evident that more work would have to be done before the spider could be dragged in. This struck the wasp, too, for again he ran around the body, examining it carefully, and returned to the hole to take measurements. He went to digging a second time. Having dug for two minutes he brought his prey to the edge of the hole, nipped out a piece of dirt here, cut away a grass stem there, and after fifteen minutes of hard and skilful labor disappeared under ground, dragging the spider after him, doubtless to form the *piece de resistance* in a winter storehouse. The engineers then resumed their work, exchanging comments of admiration.—*Chicago Inter-Ocean.*

January number was mailed January 20th.

EXCHANGES

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